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The United Nations Food and Agriculture Organization

by **JOSEPH A. BECKER***

An international department of agriculture, the United Nations Food and Agriculture Organization, was inaugurated at the Quebec Conference in October 1945. The constitution of the Organization was formally signed by representatives of 42 countries. A program of action was evolved and approved at the meeting. It provides for world-wide activities on many phases of the twin problems of increasing the efficiency of production and facilitating the distribution of food and other agricultural products.

Much emphasis was placed at the Conference in Quebec upon the need for stimulating better use of present food supplies, in order to increase the nutritional status of the people of all nations. To this end, suggestions were made which would lead to an improvement in the diets of people in countries having adequate food supplies, as well as to increased quantities and better distribution of food in areas of deficient supplies.

The Organization is pledged to the development of agricultural research. It recognizes the substantial advances made in recent years in many countries in increasing crop and livestock production and deplores the lack of progress in many countries where populations press heavily upon the food supply. Particular emphasis is placed upon the need for spreading the results of research, not only within countries but also among countries, so that people throughout the world may benefit from national progress.

The importance of fish as food was given great emphasis at the meeting, and a warning was sounded that, unless constructive international action was taken, the resources of the sea might be depleted by overfishing, such as took place after World War I. There is urgent need of exploration of waters, the potentialities of which as a source of supply are still unknown, in order that increased supplies of this valuable food may be made available without exhausting fish resources in better known waters. Because the oceans are international, the Food and Agriculture Organization has an especially significant role to play in the fishery industry.

Forests and forest products came in for extensive discussion at the Conference. A program was outlined by which the Organization might help in preventing destructive exploitation of the forest resources of the world through the stimulation of good forest-management practices. Stress was placed upon the need for more general application of the results of research in improving wood-utilization processes.

Problems relating to national and international marketing of agricultural products of all kinds, including fish and forest products, were discussed at length and made the subject of a number of specific proposals. One proposal was that the Organization should study and make suggestions concerning the diminution of trade barriers and the improvement in distribution of food products to the end that stocks would not accumulate in some countries while the populations of others were underfed.

Basic to the study of problems of production and distribution is the knowledge of underlying facts. The Conference therefore authorized the collection and compilation of statistics covering the whole field of food and agriculture. A program of statistical and informational reports was outlined, whereby the Organization might be in a position to ascertain the most pressing problems in the various fields with which it will deal.

The annual budget of the Organization is $5,000,000, a total amount which is much less than is spent in agricultural research alone in many of the countries which subscribe to the constitution. Obviously, therefore, the Organization cannot function in the manner in which departments of agriculture function in the individual countries. In point of fact, to do so might be said to impinge upon the sovereignty of nations. Many of the activities of national departments of agriculture involve standardization, inspection, and regulation. All such activities are clearly outside the scope of an international body such as the Food and Agriculture Organization, which will have advisory and consultative functions. It will serve as a clearing house not only for information but for the interchange of technical workers.

Great stress was laid upon the need of organizing technical missions, whereby a country may obtain help from the staff of the Food and Agriculture Organiza-

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Deposited by the
United States of America

tion, or from specialists from other countries, in solving problems in agricultural research and education. The fields of work in which the Organization might be active range from obtaining the services of an extension worker to demonstrate improved methods of food preparation to the planning of such agricultural-industrial developments as the Tennessee Valley Authority in the United States. An important instrument for pooling developments in agricultural science will be the creation of rosters of technical experts and the formation of standing committees of specialists to whom the national agencies may come for assistance in meeting specific problems.

The fields of work of an international organization of this kind are so numerous that only matters of extreme urgency can receive attention. The delegates of the nations attending the Conference realized this full well. While they made certain specific recommendations with respect to matters which would need early and forceful attention, in the main they delegated authority to the Director General and the Executive Committee to determine which projects would be undertaken and the relative emphasis to be placed upon each. The over-all program of the Organization is a long-time program, looking ahead to the gradual development of increased efficiency in the production of agricultural products, distribution of these products, and their utilization by the consumer. The means of this improvement are many and varied—agricultural experimentation, food chemistry, improved education of youth, expanded programs of adult education, and the support of programs looking to increased industrial activity in countries where, at present, too large a proportion of the people live upon the land and obtain their living solely from it.

Nutrition and Food Management

In the field of nutrition and food management, the Food and Agriculture Organization will undertake to make, at an early date, a rapid survey of available food resources and the requirements of the various countries. Immediate purposes of such a survey are to provide the basis for recommended international movements of food to areas of greatest need and to stimulate the early production of foods in short supply. A large section of the world's population is chronically poorly fed, and the situation has been aggravated because of the war. Stress will be laid at all times upon the improvement of the diet of the so-called "vulnerable" groups, such as school children and nursing mothers. In parts of the world, means will be sought to increase the supplies of "protective" foods—milk, vegetables, fruit, and eggs.

In many countries progress in the field of nutrition is hampered by reason of an insufficient number of specialized nutrition workers to conduct food-research work, to promote public health and nutrition education, and to instruct home workers in the preparation of foods. Facilities for training such personnel in the tropical and eastern countries are greatly needed. Progress in food conservation and technology embraces such important questions as the effect of milling and domestic methods of preparation on the nutritive value of cereals; for example, rice, wheat, and corn. The enrichment of foods by the addition of vitamins and minerals merits further study and world-wide promulgation of results.

Positive action in improving dietary standards requires joint action of agricultural and food groups with other groups—public health, education, and social service agencies—at both the national and international level. The Organization will sponsor national nutrition agencies to point up this work at a national level, and it will cooperate with similar agencies at the international level in working out a united approach.

Agriculture

Many countries have strong departments of agriculture and agricultural-research institutions affiliated with colleges, universities, or agricultural societies. Technical advancement has been enormous, and the practical application of the results has doubled and trebled the output of food and other farm products. The benefits of research have been passed on to farmers, food processors, and consumers through the press, through the schools, by radio, and by personal contact and demonstration. Forceful as this extension has been, however, millions have not heard, or have not taken advantage, of their opportunities. The Food and Agriculture Organization will seek to stimulate national efforts in capitalizing on scientific progress and, over and above this, to devise means whereby progress will be internationalized. Beneficial experimental results in one country should point the way to increased production and utilization in others. Only by concerted action can the nations profit by one another's advances. The Organization assumes responsibility for this important task.

The problems of agricultural production with which the Organization will be concerned are many and varied. Attention will be given to the development and conservation of soil resources through forest clearing, improved management of range land, irrigation, and drainage. Often the solution

to such problems requires public action, and an international agency, such as the Food and Agriculture Organization, may focus favorable attention upon them.

In furthering the application of scientific advancement to the problems of agricultural production, a long list of recommendations was approved at Quebec. The list included the establishment of a bibliographical service for the dissemination among workers of reports of progress in their fields, the promotion of exchange of publications, and the development of internationally recognized standards or units. Especial attention was directed to collaboration among national agencies, exchange of information relating to improved feeding standards for livestock and poultry, and to the application of modern techniques for the control of insect pests and diseases of both plants and animals.

The Conference emphasized the inability of agriculture to stand alone. It pointed to the interdependence of industry and agriculture and urged the nations to make a searching appraisal of their current status. Some might well take definite action to find in industry a place for excess agricultural manpower and to study joint industrial-agricultural developments whereby workers will have year-round employment. These recommendations were closely allied with those relating to credit. Nations were urged to establish policies designed to provide needed credit at reasonable terms to farmers, forest owners, fishermen, and governmental undertakings servicing agriculture while, at the same time, discouraging uneconomic borrowing and encouraging orderly debt repayment.

Forestry and Forest Products

The Conference classified the forestry problems of the nations according to the current forestry situations. Some countries with deficit supplies of forest products need to manage forests more intensively and expand their forest area. Others with extensive forest resources need to control cutting in order to ensure a continued supply. Still others, in which deforestation has resulted in depleted soil and water resources, need strong afforestation policies. Lastly, some countries, particularly in the Tropics, need to learn how best to make use of their present abundant resources.

Forest resources, by their very nature, are the particular care of governments, and national policies in turn largely determine the degree of forest protection and conservation. The Food and Agriculture Organization is in position to assist in evolving forest policies in keeping with the needs of each group of countries and in helping to develop the educational programs by which the policies can be made effective. It should be especially helpful in encouraging governments in the Tropics to profit by the experience of nations in the Temperate Zones in adopting farsighted policies of conservation and exploitation of the great remaining wood reservoirs.

Just as in crop and livestock production, there is much to be gained by an interchange of information concerning technical progress in forest management. The countries which have made great progress because their wood requirements have outrun domestic supplies, should be in position to offer most in future conservation of forest resources.

New methods of wood utilization have been developed in recent years. Progress has been especially rapid during the war. The assembling, analyzing, and disseminating of available information on these developments by the Organization should be a fruitful undertaking. Corollary to it, should be the collection of information regarding the technical properties of various woods throughout the world and their suitability for use in the making of pulp, paper, and related products.

Fisheries

The fishery industry has been greatly affected by the war and its termination. During the war about half the fish-producing nations were forced to cease operations. Reestablishment of the industry in those countries will be difficult, whereas in the other countries problems of distribution will be serious. A large part of the fish caught come from areas which are truly international in that every nation has a right to fish in them. International cooperation is needed to prevent overfishing and depletion of the stocks of fish. The Food and Agriculture Organization stands in a strategic position to bring about such international cooperation. The Conference approved a program designed to increase supplies of fish and fish products available to the ultimate consumer without impairing the source.

An early resumption of biological and hydrographic research in fishery was considered essential, and the Organization could play an important role in correlating this research and fostering the exchange of results. Similar resumption and expansion of research in the nutritional and pharmacological aspects of fishery products are desirable. Much needs to be done in sharing among nations technical information concerning improved methods of handling and processing fish, by icing, salting, canning, etc.

Fish offer one of the least expensive food products at the point of production but become one of the more expensive at the retail outlet. Research in marketing should help to bring this product within reach of the low-income consumer.

Marketing

The Conference report on marketing stated that—

> It would be useless to increase the output of food, it would be equally futile to set up optimum standards of nutrition, unless means could be found to move the food from the producer to the consumer at a price which represents a fair remuneration to the producer and is within the consumer's ability to pay.

The Organization will need to assume responsibility for collecting relevant information on supply and demand for food and other agricultural products, including fish and forest products. It can then advise governments and other international organizations as to actions to be taken to maintain and increase consumption.

To this end, the Organization will need to study commodity developments in order to warn against recurring surpluses and shortages and make provision for dealing with the underlying causes. While international action in the field of commodity arrangements will probably be the responsibility of another organization, the Food and Agriculture Organization will be in position to provide advice and suggest alternatives.

Between World War I and World War II, governments took many actions designed to protect the interests of domestic agricultural producers. These partook of the nature of price supports and income-stabilization measures. During the war there was nearly universal action in protecting the interests of consumers. The Food and Agriculture Organization will be able to study and report upon these activities and the desirability and feasibility of their continuance under postwar conditions and in the light of its own purposes and programs. In this way, it can assess past successes and failures and estimate their effect upon national and international supply and demand.

A study might be made on an international scale of the schemes, such as those providing school lunches and factory canteens, used in recent years for serving food at low prices to vulnerable groups. The Organization would then be able to suggest well-thought-out alternatives to international commodity arrangements whereby national programs could be conducted to achieve increased consumption of surplus commodities.

Wartime improvements in processing and storing foods might well be continued and knowledge of them extended to other nations. A particularly fruitful field for international cooperation lies in forwarding the adoption of recognized standards of quality and uniform contracts for dealing in food.

Rural Welfare

Much of the world's food and other agricultural products is produced by farmers, fishermen, and forest workers who obtain only a meager living in reward for their toil. In many regions populations are too dense and opportunities for alternative employment too few to provide present-day minimum requirements of food, education, and health. The solution of these problems is interwoven with and dependent upon progress in agricultural science, in industrialization of rural areas, and in general social-improvement programs and plans. The Food and Agriculture Organization will need to consider the self-supplying farmer, the agricultural laborer, and the cash, or share, tenant and cropper in reviewing recommended proposals and programs of action.

Statistics

There was general recognition at the Conference that the Food and Agriculture Organization would need to develop a competent and active statistical service. The constitution places upon the signatory nations the obligation to provide such information in the various fields in which it will work. The nations need a statistical record for their own information, and they need similar information from other countries. For its own administrative use, the Organization must have background and current statistics. It was held to be a matter of greatest urgency that the Organization take up the publication of such international statistics as formerly issued by the International Institute of Agriculture, the Centre International de Sylviculture, and the Comité International du Bois. These would be augmented and improved upon as rapidly as possible.

At the same time, the Organization held that preliminary steps should be taken to obtain a minimum of fundamental data concerning agricultural resources and production in all countries through the medium of an agricultural census. The promotion of this World Census of agriculture in general would follow the pattern set by the International Institute for the 1930 and 1940 censuses and would be urged for 1950 "or as soon as practicable thereafter." Emphasis would be placed upon holding the inquiry to a

minimum suitable for the "less statistically developed countries," to be supplemented by "more elaborate schedules for the use of the countries able and willing to adopt them."

The Organization would be in position to bring about two greatly needed improvements in all fields of agricultural statistics. First, it could give active aid to governments in improving their statistical services by constructive criticism of systems now in use, by suggesting proved techniques, and by arranging for the loan of statistical experts and the exchange of students. Secondly, it could work to bring about uniformity and comparability of definitions and terms so that there would be available a basis for comparing levels and for measuring progress among countries.

Statistics of nutrition and food consumption to be collected and collated would take the form of information on food supplies and consumption levels in all parts of the world. On the basis of the analysis of over-all food-consumption statistics or of nutritional surveys, the organization would attempt to ascertain and present a picture of the nutritional status of people in all countries. Corollary to the data on food, would be information on morbidity and mortality, on nutritional-deficiency diseases, such as pellagra and scurvy, and on infant and maternity death rates.

The statistics of nutrition, as is true of the whole field of nutrition, are in the formative stage, and a great opportunity exists for their classification and unification on an international scale.

The Conference approved a program of timely reports on crop and livestock production. It recognized the general dearth of information on these subjects for much of the world during the war and urged the early collection and publication of a review for that period. It suggested a statistical summary and appraisal of data relating to land use.

Statistics of primary processing of agricultural raw materials were given an important place, because they throw light both on total production and on food consumption.

The fishery industry needs to know much more about itself than is ascertainable from present statistical series. Not only are data needed on basic production—quantities of fish landed by origin and place of landing—but also on its utilization—for fresh sale, canning, smoking, and drying. The statement has been made that fish constitute a principal source of protein for many millions in the Orient, but no one knows at present the quantity of fish caught and eaten there. A whole statistical system, adapted to the realities of the industry, needs to be evolved for the fisheries of many parts of the world.

In the field of forestry, the resumption and consolidation of statistical series interrupted by the war are considered to be of urgent necessity. Included would be statistics of production, national and international movements, and the consumption of forest products. A general survey of forest resources and of forest-products industries was endorsed, and attention was directed to the need of assistance in setting up methodology and procedures for countries with little previous experience in conducting such a survey or census.

Marketing statistics of many kinds are needed in arriving at an understanding of trends in production and consumption. Quantities moving through distribution channels for domestic use or export, stocks at the source and at several important levels of the marketing process, and international trade are only the minimum required. Prices of the principal agricultural products at the farm and at well-established primary and world markets are needed for those engaged in trade. Prices paid at the retail level are equally important to those interested in food consumption.

The statistics gathered by the Food and Agriculture Organization, to be most useful, should be more than a history of the past; they should be more than a record of the ever-changing current scene; they should be so devised and so reported that they would cast before them shadows of coming events. To the producer, they should be significant of what to sow and when to sell; to the consumer, they should point to necessary alternatives and choices of foods and other products of agriculture. To the national administrator, they should point the way to inspired and dynamic action in increasing the efficiency of production and distribution.

Like any other conference, international, national, or sectional, the Quebec Conference gave voice to altruistic aims, stated in lofty, general, and sometimes vague terms. It was not an initial conference, however, and it did not confine itself to the framing of resolutions and recommendations. For food and agriculture, this necessary preliminary step had been taken at Hot Springs in May 1943. The Quebec Conference had as its purpose the development of policies and a program for putting the Hot Springs recommendations into effect. Anyone reading the report of the Quebec meeting will find in it an admixture of the theoretical and practical. While the objectives outlined may be beyond the hope of immediate or near-future attainment, the program includes enough specific suggestions of "what to do" and "how to do it' to guide the initial steps of the Organization in the right direction.

Danish Agricultural Production—World War I and World War II

by **KAREN J. FRIEDMANN***

With the end of World War II, the question arises as to when or to what extent prewar food-exporting countries, such as Denmark, will again become world-market suppliers. How seriously were they affected by the inroads that wartime conditions made on their capacity to produce and to export? Danish agriculture, an exporting industry throughout the war, is, after the country's liberation, anxious to recapture former markets, although its present export capacity is greatly below normal levels. For an evaluation of the current situation and the possible period of recuperation, comparisons are made with developments during World War I and the period immediately after.

The conclusion of recent hostilities in Europe finds Danish agriculture relatively intact and in many ways showing the effect of wartime conditions less than at the end of World War I. Thus, the Danish crop output in 1945 appears likely to be, roughly speaking, at the prewar, 1933–37, levels. The 1918 output, on the other hand, was 13 percent below the 1908–14 level, and output in 1919 and 1920, though better than in 1918, was still below this average. Again, cattle numbers are now almost up to the 1939 figures, and cow numbers are below the 1939 level by only a small percentage, whereas after World War I cow numbers did not reach their prewar magnitude until the middle 1920's. The milk yield per cow also decreased less drastically. Hogs, which in the summer of 1945 numbered only one-half as many as before the war, nevertheless make a better showing than in 1918, when the corresponding proportion was one-fourth. Chickens alone show a greater reduction now than at the end of World War I, probably in part reflecting the fact that the raising of poultry had become more commercialized in 1939 than in 1914. Comparable statistical data for the two war periods reveal the developments reflected in the output of the main agricultural products (tables 1 and 2).

Developments During World War I

Though Denmark remained neutral throughout World War I, Danish agriculture was necessarily greatly affected by the outbreak of hostilities owing to its dependence on foreign markets for certain farm supplies as well as for the disposal of its surplus of livestock products.[1] Shortly after the outbreak of the war in August 1914, the British interpretation of contraband, etc., led to the retention of shipments of, among other things, grain and feedstuffs destined for Denmark. Subsequent negotiations and agreements created a basis for continued trade, whereby Denmark was able to receive overseas supplies and continue to export agricultural products to England and Germany in certain proportions and with certain limitations.

As a result, those important farm supplies continued to arrive, even though under difficulties, until early 1917, when unrestricted submarine warfare began. Total grain and oil-cake imports, which in 1912 had totaled 1,565,000 short tons in terms of feed units,[2] rose to 1,950,000 tons in 1915 because of the release in early 1915 of the shipments retained by the British in late 1914, but they dropped to 540,000 short tons in 1917, and in 1918 there were no imports of grain or other feedstuffs whatsoever. Imports of phosphate fertilizer, which had taken place only on a much reduced scale during the first 2 years of the war, also fell to a very low level in 1917 and were nonexistent in 1918, whereas potash and nitrogen fertilizers continued to arrive in fairly adequate quantities. Obviously, prices of imported products increased sharply. The Government was therefore faced with the problem of keeping domestic prices within bounds in spite of the scarcity of commodities and rising import prices.

A discussion of the policies of the Danish Government relating to the price and supply of foodstuffs and agricultural raw materials and their effect on agricultural production cannot be undertaken at this time, but mention may be made of the fact that the low ceiling price on rye bread is thought to have been in part responsible for the steady reduction in the rye acreage, which was more than 20 percent smaller

*Office of Foreign Agricultural Relations.

[1] Largely based on COHN, EINAR. DANMARK UNDER DEN STORE KRIG; EN ÖKONOMISK OVERSIGT. (Carnegie endowment for international peace, Division of Economics and History. Verdenskrigens ökonomiske og sociale historie. Skandinavisk serie.) 333 pp., illus. Kjöbenhavn. 1928.

[2] A feed unit represents the feed value of 1 kilogram (2.2 lbs.) of barley.

in 1917 than in 1914. Apart from this, acreage changes were on the whole not significant during the war. Only in 1918 and 1919 did the potato acreage register a marked increase.

TABLE 1.—*Agricultural production in Denmark, average 1908–14, annual 1914–20*

Crop	Prewar average 1908–14	1914	1915	1916	1917	1918	1919	1920
	1,000 short tons							
Bread grains	643	556	612	484	377	546	595	559
Feed grains	1,819	1,671	1,915	1,796	1,334	1,537	1,767	1,742
Total grains	2,462	2,227	2,527	2,280	1,711	2,083	2,362	2,301
Potatoes	947	1,106	1,182	743	957	1,218	1,592	1,316
Sugar beets	843	1,060	909	811	973	1,040	1,121	933
Feed roots	13,176	13,898	14,868	12,780	13,831	13,544	13,179	13,053
	Million feed units [1]							
Hay and straw	1,395	1,200	1,030	1,556	794	741	984	1,229
Grass and green feed	[2] 1,500	1,540	1,490	1,550	1,570	1,570	1,410	1,540
Total crops	6,810	6,310	6,830	6,780	5,600	5,950	6,430	6,590
	1,000 head							
Livestock: [3]								
Cattle: Total	[4] 2,253	2,464	2,417	2,290	2,458	2,124	2,188	2,286
Cows	[4] 1,282	1,310	1,281	1,141	1,147	1,024	1,042	1,112
Hogs	[4] 1,468	2,497	1,919	1,983	1,641	621	716	1,008
Chickens	------	15,140	------	------	12,288	9,784	12,134	13,987
	Pounds [5]							
Livestock products:								
Milk yield per cow	[6] 5,560	5,820	5,670	5,710	5,310	4,030	3,660	4,720
	1,000 short tons							
Total milk	------	3,858	3,588	3,318	2,894	1,984	1,874	2,866
Butter	------	129	122	116	100	64	68	94
Beef and veal	------	132	161	117	148	143	109	115
Pork	------	252	234	229	225	64	74	109
Eggs	------	53	52	50	49	35	39	46

[1] A feed unit represents the feed value of 1 kilogram (2.2 lbs.) of barley.
[2] 1911–14.
[3] July census, except 1915 (May) and 1916 (February).
[4] 1909 only.
[5] No prewar data available.
[6] 1912 only.

Compiled by the Office of Foreign Agricultural Relations from official statistics, with the exception of milk yield per cow, which was taken from COHN, EINAR. DANMARK UNDER DEN STORE KRIG; EN ÖKONOMISK OVERSIGT. Kjöbenhavn. 1928.

An examination of the data for these years reveals the variations of the crops (table 1). The first two crops harvested during the war were quite good—that of 1915 particularly so—but the 1917 crop was a failure. The weather during the 1916–17 growing season was mainly responsible. An exceptionally hard winter preceded an unusually dry period in early summer, and excessive rains during the harvest month completed the unfavorable season. Added to this was the shortage of phosphate fertilizers. Dwindling imports of feedstuffs, referred to above, combined with the poor harvest, drastically reduced available feed supplies, since, obviously, the food supply of the people had first claim on crops. Expressed in feed units, the domestic output of food and feed, plus imported feed in 1917, was 25 percent smaller than the average of the preceding years, and, although domestic crops were a little better in 1918 than in 1917, imported feedstuffs were entirely lacking so that the total amount available during the winter of 1918–19 was even a little smaller than during the preceding winter.

In view of these developments regarding domestic crops and feed imports, trends in livestock numbers (table 1) are not surprising. But obviously other factors—primarily prices of livestock products—also played a role. Thus, the reduction in cattle numbers during the early war years, when feed supplies were on the whole satisfactory, must in the main be ascribed to tempting export prices. Trade statistics also reveal that exports of cattle (live and slaughtered) during the years 1915–17 were more than 50 percent larger than the prewar average. The decrease in livestock numbers which took place after 1917 must, on the other hand, be ascribed to the feed shortage.

In this connection, one may note that the milk yield per cow remained around 5,700 pounds annually through the period 1914–16, after which it began to go down and fell to the drastically low level of 3,650 pounds in 1919. The combined effect of the reduced milk yield and the decrease in the number of cows was a drop in total milk production of more than 50 percent (table 1), and butter production fell almost as severely. Reports of this period state that the cows were kept on a starvation diet through the winter of 1918–19. In the course of the spring of 1919 oil cake again began to appear in the imports of the country, and the increase in the milk yield by 1920 seems to have been good.

Hog numbers had reached the exceptionally high level of 2,500,000 in 1914; and, when the British retention of shiploads of feed grain, etc., for Denmark in the fall of 1914 temporarily caused a shortage of hog feed—the 1914 grain crop was also somewhat short—a reduction of hog numbers took place, as was to be expected. Through 1916, hog numbers remained close to 2,000,000, but the entry of the United States into the war in 1917 put a definite end to corn imports, and, with the above-mentioned poor crop yields in 1917, the drop in hog numbers was striking. In April 1918, hog numbers reached the unprecedentedly low figure of 400,000; in July they stood at 621,000, or 25 percent of the figure for July 1914. Pork production fell in the same proportion, and in neither 1918 nor 1919 were there any pork exports.

This outline of wartime developments, relating to some of the main agricultural products, clearly indicates that a considerable depletion of agricultural resources took place during the latter part of the period of World War I. Even though prices were so high that farm incomes, in spite of reduced production, kept pace with incomes in other sectors of the population, the situation as a whole was not so favorable as this fact would indicate and, indeed, was thoroughly untenable. This is also reflected in prices for agricultural property, which did not show the gain that one would expect in view of the increase in prices of agricultural products.

A more extended statistical series would show that hog numbers did not reach their 1914 level until 1923, and cow numbers not until the middle 1920's. Then, as now, there were, however, uncertainties relating to export markets and prices which at times proved to have a more limiting effect upon the expansion of production than technological or physiological factors.

Developments During World War II

When, by way of comparison, one looks at the figures portraying developments during World War II (table 2), he must bear in mind that the German occupation in April 1940 put an end to all imports of food and feedstuffs. By September 1940 total stocks of oil cake in the country had dropped to 72,000 short tons, or only about one-tenth of normal annual consumption. Imports of phosphate also dropped shortly to insignificant amounts, whereas potash from Germany and nitrogen fertilizers from Norway continued to be available. Prices for agricultural exports were, on the other hand, set at a favorable level.

Knowing what the supply situation would be and remembering the experience of World War I, Danish agricultural leaders and farmers generally concentrated their efforts on trying to make the best possible use of domestic feed resources in order to avoid unnecessary reductions in livestock numbers. Calculations were made of optimum livestock numbers that could be maintained on domestic feed. Little could be done in the way of increasing the total amount of domestic feed, but efforts were made, apparently with some success, to provide more protein-rich winter feed than the roots which constitute the main part of the indigenous winter cattle feed. This was done through the silaging of root tops, etc., and through improvement of pastures and the hay crop. Larger quantities of skimmed milk were also utilized for cattle feeding.

TABLE 2.—*Agricultural production in Denmark, average 1933–37, annual 1939–45*

Crop	Prewar average 1933–37	1939	1940	1941	1942	1943	1944	1945
	1,000 short tons							
Bread grains	662	728	508	550	472	755	758	[1] 636
Feed grains	3,040	3,265	3,071	2,434	3,692	3,512	3,329	[1] 3,220
Total grains	3,702	3,993	3,579	2,984	4,164	4,267	4,087	[1] 3,856
Potatoes	1,440	1,349	1,490	1,451	1,838	2,141	1,553	[2] 1,731
Sugar beets	1,476	1,745	1,731	1,946	1,755	1,609	1,400	------
Feed roots	25,199	27,412	25,954	24,350	23,115	23,230	19,829	------
	Million feed units [3]							
Hay and straw	1,711	1,581	1,370	1,083	1,461	1,854	1,961	------
Grass and green feed	2,696	2,908	2,809	2,386	2,478	2,846	3,019	------
Total crops	10,780	11,320	10,895	9,541	10,632	11,601	11,291	------
	1,000 head							
Livestock on farms:								
Cattle: Total	3,092	3,271	[4] 3,279	3,014	2,870	2,980	3,137	[4] 3,231
Cows	1,664	1,614	[4] 1,619	1,452	1,391	1,436	1,529	[5] 1,550
Hogs	3,413	3,133	3,199	1,785	1,189	2,048	2,049	[4] 1,630
Chickens	------	32,399	24,568	12,110	9,575	13,911	15,174	[4] 16,336
	Pounds							
Livestock products:								
Milk yield per cow [6]	7,000	7,220	6,280	5,510	5,290	5,840	5,790	[2] 5,840
	1,000 short tons							
Total milk	5,820	5,817	5,095	3,991	3,679	4,203	4,420	[2] 4,519
Butter	200	202	180	137	120	138	141	[2] 146
Beef and veal	164	171	223	177	162	112	143	[2] 127
Pork	381	345	358	209	133	203	237	[2] 193
Eggs	117	148	125	65	43	41	51	[2] 55

[1] Preliminary.
[2] Estimates.
[3] A feed unit represents the feed value of 1 kilogram (2.2 lbs.) of barley.
[4] Some doubt whether this represents animals on farms or total number of animals.
[5] March.
[6] Calculated by dividing annual milk production by cow numbers at July census.

Compiled from official statistics by the Office of Foreign Agricultural Relations.

In contrast to the situation during World War I, the rye acreage increased during the recent conflict. Wheat underwent great fluctuations; the acreage was 330,000 acres in 1938 and 1939, but, mainly owing to a couple of rather severe winters, it fell to around 200,000 acres in 1940 and 1941 and, after the very severe winter of 1941–42, to a harvested acreage of only 14,000 acres in 1942. After a gradual climb, the wheat area reached 215,000 acres in 1945. The potato acreage increased sharply during the years 1940 and 1943, but it does not constitute a large percentage of the total acreage in the rotation.

A series of good crop years occurred during 1940–45, with the notable exception of 1941, when only roots were up to normal levels (table 2). Again climatic conditions were mainly responsible—a hard

winter, drought in May–July, and excessive precipitation in August. While shortages of fertilizers and manure at the time were advanced as a contributing cause, the good crops of the following years, when fertilizer shortages still prevailed, have somewhat disproved this theory. Later calculations by Danish authorities have also tended to indicate that an overfertilization with phosphate fertilizers (the only fertilizer in acutely short supply) during prewar years established a reserve in the soil, on which the crops of the war years have drawn.

With the complete absence of imported feedstuffs and the utilization of domestic rye and wheat for bread grain—in normal years mostly imported—the available feed supply was drastically reduced. Compared with 1938–39, the feed supply in 1941–42 was reduced by 30 percent, its protein content by over 40 percent. The 1941–42 reduction in feed supplies may well be compared in severity with the 1917–18 reduction; but, while the consequences for the livestock industry were serious, the decline in livestock numbers did not reach the proportions of World War I. The recuperative powers of Danish agriculture had a chance to bring about considerable improvement during the following years, favored by good feed crops. With the exception of wheat, which constitutes only a small part of the Danish grain output, the crops of 1942 were good, and the response in increased livestock numbers, milk yields, and pork production is clearly indicated in the 1943 livestock figures (table 2).

The reduction in the production of beef and veal is of course an indication of the same trend. The crop year 1943–44 brought some further improvement, though of much smaller proportion, and production during the last war year may be characterized as an attempt to hold on to the gain. The 1944 root crop, including potatoes, was considerably below par, and there was again a reduction in hog numbers from 1944 to 1945. Cattle numbers, on the other hand, continued their upward trend, and there is reason to expect that the average milk yield per cow for 1945 will be fully up to that of 1944.

Conclusion

In summarizing the situation, a comparison may be made between the percentage reduction in livestock numbers and milk yields from 1939 to 1942, the year in which the livestock industry reached its lowest level, as well as from 1939 to 1945, the year of the first postwar livestock census, and the comparable reductions during World War I. (See table 3.)

The conclusion is, of course, inescapable that a good deal of the relatively better position of Danish agriculture at the end of this war, compared with the situation in 1918 or 1919, results from the fact that, whereas 1941 was the only lean year of the war just concluded and was followed by four good growing seasons, unfavorable weather and resulting poor crops occurred toward the end of World War I. In view of what has been said above, better soil fertility because of a high degree of fertilization before World War II seems to have played a part in the good crop results of 1942–45. Furthermore, the experience of World War I had obviously not been forgotten. The consequent determination to keep up herds insofar as possible and, to this end, to make the best possible use of domestic feed resources appears to have been fruitful.

TABLE 3.—*Percentage reduction of specified livestock numbers and milk yields in Denmark, World Wars I and II*

Item	Percentage reduction			
	1914 to—		1939 to—	
	1918	1919	1942	1945
Livestock numbers:	*Percent*	*Percent*	*Percent*	*Percent*
Cattle	14	11	12	1
Cows	22	20	14	4
Hogs	75	71	62	5
Milk yield per cow	30	37	27	2

Compiled by the Office of Foreign Agricultural Relations from official statistics.

As already stated, five or more years were required to restore the livestock numbers to their prewar level after World War I. Clearly, this is no indication whatsoever as to the possible restoration period after this war. Cattle numbers are already up to the prewar level, and cow numbers could well reach the same level within the 1945–46 crop year. So far as milk yields are concerned, the percentage increase that took place from 1919 to 1920, when oil cake was again available, was larger than the increase that would be called for to bring present milk yields up to the 1939 figure. Finally, in view of the increase in hog numbers from 1942 to 1943—achieved entirely without the aid of imported feed—hogs, too, could apparently be brought close to their prewar level in a year's time, if conditions were favorable for such an expansion. Actually, however, the outlook is not so bright.

Danish farmers, now again turning to England for their main export outlet, have had to accept sizable reductions in butter and bacon prices obtained in the English market, and further price cuts are contemplated to bring prices paid for Danish exports in line with prices paid for exports from the British Dominions. Unless adjustments of exchange rates

are brought to bear on this problem—or Government subsidies, which actually have been adopted for pork and butter for the current crop year—conditions for an expansion of the livestock industry are indeed not favorable. These factors, therefore, in connection with prices of possible imports of farm supplies, will determine the trend in Danish agricultural production in the immediate future.

Vanilla-Bean Production and Trade

by **HELEN B. WHITMORE***

Shortages of natural products during World War II compelled many United States flavoring and perfume manufacturers to use substitutes and synthetics. After the war, the reversion to natural products may not be 100 percent. Some manufacturers may have so modified their formulas, processes, and advertising that a return to former practices is not feasible. Consumer preference, too, may have changed. Those connected with the vanilla-bean industry, in particular, are concerned with the pattern of postwar consumption and trade. During the war, vanilla beans in the United States were scarce and high-priced. Circumstances favored the sale of imitation vanillas, and the manufacture of vanillin, an essential ingredient in their production, increased in spite of wartime difficulties from an average of 417,000 pounds in 1937 and 1938 to 650,000 pounds in 1943 and 1944.

The Beginnings

Ever since the Spanish conquistadores introduced the vanilla bean [1] into Europe, it has been an article of world commerce. When Cortez conquered the Aztec Indians in 1521, he became the possessor of more than gold and silver, for the Aztecs knew the secret of preparing a delicious beverage—chocolate flavored with vanilla (*5*, *9*).[2] Cortez and his men were delighted with the new drink, and they sent cakes of vanilla-flavored chocolate to Spain, as well as monetary treasure (*1*). Chocolate, or cocoa, drinking became popular in Spain, and the custom soon spread to other parts of Europe. The vanilla bean came to be prized not only as a superb flavoring material but also as the source of a medicinal ingredient. During the sixteenth and seventeenth centuries it was much in demand for use in medicine.

At the time of the Spanish Conquest, vanilla was not a cultivated crop in Mexico. The Indians obtained their supply from the plants growing wild in the forest. Quite likely the first vanilla plantations were established by planting cuttings in order to meet the increasing European requirements for vanilla beans. Just when this occurred is not known, but records in the Mexican archives show that by 1760 plantations were in existence (*3*).

FIGURE 1.—Artificial pollination of vanilla flowers in Mexico.

Men also tried to grow vanilla in other parts of the world, and, although the plants took root, grew, and flowered, they seldom produced fruit (*8*). The vanilla plant is incapable of self-pollination and only in Mexico did natural agents effect pollination on a

*Office of Foreign Agricultural Relations.

[1] The dried, cured fruit of *Vanilla fragrans* (Salisb.) Ames (*V. planifolia* Andr.).

[2] Italic numbers in parentheses refer to Literature Cited, p. 16.

scale large enough to produce a crop worth harvesting. For many years, European botanists studied methods of artificial pollination, but it was not until the 1830's that Dr. Charles Morren, of the University of Liege, and M. Neumann, of the Museum of Natural History in Paris, working independently, both discovered the same method of hand fertilization (*2*). Records show that, in 1839, Daniel Beauperthuy introduced artificial pollination into Martinique (*6, 4*), but its significance appears to have been overlooked. At any rate, it was a Negro slave, Edmond Albius of Réunion, who, about 1841, perfected a technique for hand-pollinating vanilla flowers, which was adopted speedily in all producing countries. Although the method was essentially the same as that used by Neumann and Morren in Europe, without the work of Albius it might have been years before large-scale production of vanilla beans became a reality (*6*).

FIGURE 2.—Vanilla plant, 14 months old, grown from cutting in Nicaragua.

By 1875, in addition to Mexico and Réunion, the Comoro Islands, French West Indies, French Oceania, Mauritius, Seychelles, and Java (*6, 4*) were growing vanilla on a commercial scale. Madagascar did not begin to export significant quantities of the beans until about 1910, but production there increased so rapidly that by 1920 the country had become the world's chief source of supply, a position it still occupies (table 1).

TABLE 1.—*Exports of vanilla beans from principal producing countries, average 1935–39, annual 1940–44*

Country	Average 1935–39	1940	1941	1942	1943	1944
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Madagascar & dependencies	895	[1] 794	[1] 719	[1] 639	[1] 1, 239	[1] 55
Mexico	204	376	460	117	202	40
French Oceania	273	265	465	121	229	34
Réunion	111	(2)	(2)	(2)	(2)	(2)
West Indies	[3] 40	[4] 32	[4] 42	[4] 40	[4] 31	[4] 5
Netherlands Indies	25	49	(2)	(2)	(2)	(2)
Other countries [5]	8	12	12	15	15	1
Total	1, 556					

[1] Estimated production as given in consular reports.
[2] Not available.
[3] Average 1937–39.
[4] Estimated on basis of United States imports. Wartime conditions cut off practically all markets except the United States.
[5] Estimate. Includes Mauritius, Seychelles, British Oceania, Puerto Rico, continental Africa, and South American countries.

Compiled from Foreign Service reports and cables and official statistics.

Until the first part of the twentieth century, European countries absorbed most of the world output of vanilla beans. Then the United States moved into first place and today consumes about two-thirds of all the vanilla beans entering world trade, or approximately a million pounds annually (table 2). The following tabulation of United States imports,[3] according to 5-year averages,[4] indicates the increase in consumption since 1885:

Period	Imports 1,000 pounds	Period	Imports 1,000 pounds
1885–89	130	1915–19	833
1890–94	196	1920–24	1, 011
1895–99	175	1925–29	1, 084
1900–04	388	1930–34	1, 225
1905–09	826	1935–39	1, 006
1910–14	905	1940–44	943

No imports of beans are shown in United States official statistics prior to 1863, but some importation occurred before that time. In 1857–58, a United States consul in Veracruz, Mexico, reported clearance of ships bound for the United States with vanilla beans in their cargoes (*12*). In 1858–59, the consul, in a report covering exports to the United States from Mexico, made the following entry (*13, p. 398*): "Vanilla beans, 34 boxes, at $12 to $30 per 1,000—$11,625." The figure 1,000 refers to the number of beans, since the common practice at that time was to report vanilla beans in this manner.

[3] Imports for consumption.
[4] Fiscal years, July–June, to 1918; calendar years thereafter.

TABLE 2.—*United States imports of vanilla beans for consumption, average 1935–39, annual 1940–45*

Country	Average 1935–39	1940	1941	1942	1943	1944	1945 [1]
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Barbados					1		
Brazil			10	1			
British E. Africa			8	[2]		3	
British Oceania			[2]				
Dominican Republic				2	1		
France	494	213	19				
French W. Indies	16	24	31	24	8	7	33
French Oceania	43	154	200	185	92	171	134
Guatemala				[2]			
Madagascar	193	494	87	372	368	231	841
Mexico	223	371	577	139	220	450	139
Netherlands	4						
Netherlands Indies	21	17	83	20			
Trinidad & Tobago				[2]	[2]	2	1
Union of S. Africa				1			2
Other Br. W. Indies	4	8	10	14	24	[3] 43	[3] 46
Other Fr. Africa	5	28					
All other	3	1					
Total	1,006	1,310	1,025	758	714	907	1,196
Value (000's)	$2,503	$4,913	$5,616	$4,606	$4,183	$5,120	$6,586

[1] 9 months only.
[2] Less than 500 pounds.
[3] Mostly Windward Islands.

FOREIGN COMMERCE AND NAVIGATION OF THE UNITED STATES and records of the Bureau of the Census.

During the fiscal year ended June 30, 1863, 2,167 pounds of vanilla beans, valued at $11,466, entered the United States, chiefly from the Spanish possessions. Only 561 pounds were listed from Mexico, but the quantity from the Spanish possessions was probably a reexport from Mexico. During the fiscal year 1864–65, of the 6,576 pounds, valued at $13,019, which the United States imported, 5,563 pounds came from Mexico. At that time, there was an import duty of $3.00 per pound on vanilla beans. In August 1872, the duty was removed, and none was imposed again until 1914, when an import duty of 30 cents per pound was levied. In 1936, this duty was reduced to 15 cents and has not been changed to date.

Advent of Vanillin

Although the first patents for producing vanillin from oil of cloves were taken out in 1876 (*7, p. 804*), vanillin was not sufficiently competitive to cause a decrease in prices for vanilla beans until about 1904 (*8*). The first vanillin produced sold for $766 per pound. By 1886, the price had decreased to $76.50 per pound and, by 1900, to $8.75 per pound. During 1906–09, the price of vanilla beans fell so low that growers in the French Colonies derived little profit from their crops. A *Ligue à la defense de la vanille* was formed, the purpose of which was to secure legislation establishing a duty on vanillin imported into France and requiring that artificial vanilla extract be so labeled. These purposes were realized, but the increase in United States imports of vanilla beans probably did more to help the French growers to survive the crisis than the new legislation.

FIGURE 3.—Vanilla blossoms and leaves.

Vanillin, or methoxy-protocatechuic aldehyde, is the principal aromatic constituent of the vanilla pod, which contains from about 1.2 percent to 2.9 percent of vanillin (*7*). Synthetic vanillin is indentical with the vanillin which occurs naturally in the vanilla bean, but the flavor of the natural extract is not due to vanillin alone but also to the other aromatic constituents found in the vanilla bean.

In 1898, imports of vanillin into the United States were officially reported for the first time. In that year, 5,501 pounds entered the country, valued at $60,418, or $10.98 per pound. The import duty was then $12.80 per pound. In 1909, it was reduced to $3.20 per pound and in 1913, to $1.60. The present duty is 7 cents per pound and 45 percent ad valorem, but United States imports of vanillin in recent years have been insignificant. Domestic production has increased steadily, and improved chemical processes have made it possible to put vanillin on the market at prices much below those which prevailed during

the first quarter of the century. Eugenol vanillin now sells for about $2.65 per pound, and lignin and guaiacol vanillin, for $2.35 per pound.

The two main sources of vanillin are guaiacol and eugenol from oil of cloves. Guaiacol occurs naturally in beechwood creosote, but much of that used for production of vanillin is obtained from coal tar. According to a British writer (*10*), these two sources of vanillin are faced now with competition from a third one—sulphite liquor, a waste product of the pulp industry. About 1937, a Canadian paper mill began manufacturing vanillin from sulphite liquor. The chief chemist of the company reported that the vanillin sold so well production was increased the next year. He also stated (*11*) that—

> in spite of the fact that more vanillin is used than any other aromatic flavoring chemical, the waste sulphite liquor available from the mill would be more than sufficient to satisfy the world's present requirements.

FIGURE 4.—Vanilla vine, with cluster of beans, grown under shading banana plants in Madagascar.

Immense quantities of sulphite liquor go to waste every year in the United States. If it is true that vanillin can be produced from this waste liquor at less expense than from guaiacol and eugenol, possibly sulphite liquor might seriously compete with these products. In this event, repercussions would be felt in the market for oil of cloves, and research probably would be undertaken to discover new uses for vanillin.

Imitation Versus the Natural Extract

Although vanillin may become still more inexpensive, it is not likely ever to replace entirely the use of the vanilla bean for flavoring purposes. The cost of flavoring in relation to the total cost of a product is usually so small that manufacturers seek first to cut costs on other items. Manufacturers of quality ice cream and confectionery are the best customers for "pure" vanilla extract. Approximately one-half the ice cream produced in the United States is flavored with vanilla, and, of this half, a great deal is flavored with the natural extract.

Imitation vanilla is used to a large extent by the bakery trade. In the home, the imitation may supplant the natural product, for few housewives can fail to be impressed by the difference in price! Side by side on the grocer's shelf there may be a pint bottle of imitation vanilla priced at only 20 cents and a 4-ounce bottle of "pure" vanilla marked at 70 cents. Some observers are of the opinion, however, that inexpensive imitation vanillas have actually enlarged the field for flavoring extracts, since they are used in many cases where no flavoring at all was previously used. Nevertheless, the competition of imitation vanilla should not be underestimated. Consumption of vanilla beans in the United States has increased, but the increase has not been so large proportionately as the increase in population. Business depressions may be responsible to some extent, but probably the principal factor limiting vanilla-bean consumption has been the use of imitation vanilla.

Production

The importance of such a crop as the vanilla bean cannot be judged solely by the quantity produced. As every housewife knows, a little vanilla goes a long way. Less than a pound [5] of beans is used in making a gallon of extract. That gallon of extract will flavor dozens of puddings, cakes, and milk shakes and many servings of ice cream. Although world production probably has never exceeded 2 million pounds a year, it has provided numberless tasty desserts and confections.

[5] About 13.35 ounces of vanilla beans are generally used for each gallon of extract.

World production of vanilla beans during 1935–39 averaged approximately 1,550,000 pounds a year. Since only small quantities of vanilla beans are consumed in the producing countries, their exports over a period of years are considered approximately equal to production (table 1).

The principal producing countries are Madagascar, French Oceania, Mexico, Réunion, the West Indies, and the Netherlands Indies. In normal times, Madagascar exports about 60 percent of all the vanilla beans entering world trade. Prices, therefore, depend to a large extent upon the quantities produced in Madagascar. After Madagascar, French Oceania and Mexico are the most important producers. Mexican beans, which are famous for their excellence, command the highest prices. Beans from French Oceania have a strong heliotrope odor, and for that reason they are more suitable for use in perfumery than for a flavoring material.

TABLE 3.—*Exports of vanilla beans from France, by country of destination, 1935–38*

Country	1935	1936	1937	1938 [1]	Average 1935–38
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Belgium-Luxembourg	30, 849	27, 527	18, 975	12, 939	22, 572
Czechoslovakia	18, 254		12, 615	10, 897	10, 441
Denmark	37, 304	36, 347	19, 471	21, 720	28, 710
Germany	115, 863	83, 735	124, 163	77, 842	100, 401
Great Britain	82, 296	132, 119	86, 974	91, 800	98, 297
Hungary				9, 303	2, 326
Italy	17, 218		5, 835		5, 763
Netherlands	33, 159	33, 329	24, 048	32, 707	30. 811
Poland	40, 662	23, 827	18, 197	23, 067	26, 438
Rumania				7, 423	1, 856
Switzerland	31, 768		22, 635	18, 847	18, 313
Yugoslavia				6, 887	1, 722
Total above	407, 373	336, 884	332, 913	313, 432	347, 650
Canada				10, 668	2, 667
United States	654, 140	673, 629	419, 864	467, 463	553. 774
Argentina	17, 249		16, 854		8, 526
Brazil				6, 477	1, 619
Paraguay			7, 518	5, 445	3, 241
Uruguay			6, 129		1, 532
Algeria	2, 487		1, 878	2, 222	1, 647
Tunisia	5, 326		630		1, 489
Fr. W. Africa	337		602		235
Palestine	787				197
Other countries	81, 925	114, 291	50, 800	28, 300	68, 829
Total all	1, 169, 624	1, 124, 804	837, 188	834, 007	991, 406

[1] Includes oleoresin vanilla extract.

TABLEAU GÉNÉRAL DU COMMERCE EXTÉRIEUR DE LA FRANCE, annual reports.

In September 1942, the U. S. Office of Price Administration established maximum prices on vanilla beans. The ceiling price per pound, f. o. b. New York or Philadelphia, for Tahiti (French Oceania) White Label beans is $6.00, and prices for top grades of Mexican and Bourbon (Madagascar) beans are $11.00 and $10.00, respectively.

Available data indicate that 1944–45 production totaled about 1,100,000 pounds. Madagascar's output was estimated at 556,000 pounds, or less than half the previous crop. A severe drought reduced the Mexican crop to 150,000 pounds. During 1944, French Oceania produced about 265,000 pounds and the West Indies approximately 50,000 pounds. No data are available for Réunion, Seychelles, Mauritius, and the Netherlands Indies, but together they probably produced at least 80,000 pounds. During the war, there was little incentive for growers in Madagascar and neighboring islands to continue vanilla production. Shipping to France was entirely cut off, and that to the United States was greatly restricted and very uncertain. At least one large shipment of Bourbon beans, en route to the United States, was sunk during the summer of 1944.

Outlook for 1946

The first beans from the 1945–46 Madagascar crop, forecast at 600,000 pounds, were expected to reach the United States by December 1945, but those from the corresponding Mexican crop will not be available in quantity until the spring of 1946. Estimates of the Mexican crop vary from 175,000 to 350,000 pounds. No data for Réunion are available, but the crop doubtless will be much smaller than the prewar average of 110,000 pounds. The 1945 crop in French Oceania, harvested from May to September, is expected to reach 280,000 pounds. Output in the Seychelles, Mauritius, and the West Indies probably will be normal. No reports have been received concerning the condition of vanilla plantations in the Netherlands Indies. Total 1945–46 world production is expected to exceed the estimated production of 1,100,000 pounds in 1944–45 but to fall short of the 1935–39 average of 1,550,000 pounds.

Although a below-average crop has been forecast for 1945–46, indications are that supplies of vanilla beans will be sufficient to permit United States con-

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sumption during 1946 at the prewar level. United States imports may exceed the 1935–39 annual average of 1 million pounds, but European imports for consumption doubtless will be substantially less than in prewar years.

Accurate determination of European consumption is extremely difficult, because imports of vanilla beans are not shown separately in the trade statistics of all the countries. The vanilla-bean trade of Europe, however, was monopolized by France. French imports came almost exclusively from French colonies, and the colonies, in turn, sent their output to France, with the exception of quantities exported directly to the United States, Australia, and a few other non-European countries. In the immediate prewar years, the average annual consumption in France was about 180,000 pounds. On the basis of French consumption plus reexports from France to countries in Europe (table 3), European consumption for the years 1935–38 averaged about 525,000 pounds annually. Indications are that much less than this quantity will be consumed in 1946. The war has left many countries in such an impoverished condition that use of all flavorings will be curtailed, and shortages of certain products, such as sugar, will limit the manufacture of confectionery and pastry in which vanilla flavoring might be used.

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